



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,913	03/30/2004	Jisoo Kim	LMRX-P036/P1213	5070
32986	7590	12/07/2004	EXAMINER	
IPSG, P.C. P.O. BOX 700640 SAN JOSE, CA 95170-0640			PERT, EVAN T	
			ART UNIT	PAPER NUMBER
			2829	

DATE MAILED: 12/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/813,913	Applicant(s) KIM ET AL.	
	Examiner Evan Pert	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☒ Claim(s) 1-40 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are non-compliant with 37 CFR 1.84(p)(3), which states that all lettering and numbering in drawing "must" measure minimum 1/8 inch height. Furthermore, Step 708 in Fig. 7, reading "is present is the contact" should seemingly read --is present in the contact opening-- (for example, see [0067], last sentence in view of Fig. 5).

New drawings are required.

Specification

2. The specification is objected to for informalities:

At [0001], "methods and apparatus methods and apparatus" is redundant.

At [0003], last sentence "Appropriate etchant source are then flowed..." is not grammatically correct.

At [0028] and [0029], the phrase "is present is the contact after the exposing" should seemingly read --is present in the contact opening after the exposing-- (for example, see [0067], last sentence in view of Fig. 5).

Correction is required.

Claim Objections

3. Claims 1-40 are objected to because of informalities in the independent claims:

In claims 1 and 21, the phrase "is present is said contact after said exposing" should seemingly read --is present in said contact opening after said exposing-- (for example, see [0067], last sentence in view of Fig. 5).

In claims 1 and 21, 2nd line, the phrase "contact reaches" should read --contact opening reaches--, for better grammatical clarity.

Appropriate correction is required.

Allowable Subject Matter

4. Claims 1-40 are objected to for informalities in the base claims, but are otherwise allowable.
5. The following is a statement of reasons for the indication of allowable subject matter:

While the prior art discloses methodologies involving detection of an etching end-point by detecting metal chloride, the prior art does not suggest or disclose detection of metal chloride "in a contact opening" for determining an end-point of etching a contact opening (with plasma) to reach an underlying metal layer, wherein the underlying metal layer generates the metal chloride when the etching of the contact opening reaches through to the underlying metal layer.

As seen in Fig. 5, detection of metal chloride can provide a meaningful assessment of a contact opening etched to reach an underlying metal layer.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Burns et al. (US 4,687,539) discloses the detection of copper chloride of determining an etching end-point of a contact window using a laser etching operation, but does not suggest applying the method to etching with plasma.

Klippert II et al. (US6,136,712) teaches the prior art problem of determining etching end-point in etching contact openings over metal contacts.

US 2001/0023991 A1, US 5,312,515, US 5,200,032, JP 4-106921, JP 2-172224, US 4,675,072, and US 4,289,188 disclose detecting etching end-points by detecting metal chloride, but these references detect a falling off of concentration to detect when a layer has been etched away, in contrast to applicant's claimed invention where the detection of a rise in concentration of metal chloride in a contact opening indicates that a contact opening has been etched through to reach an underlying metal contact layer.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969.

The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Tokar can be reached on 571-272-1812. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



EVAN PERT
PRIMARY EXAMINER

ETP
November 29, 2004